Profiles of Salinities, Temperatures and Oxygens in the Strait of Georgia and Howe Sound, January 1969

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Les établissements des Sciences et levés océaniques dans les régions et à l'administration centrale ont cessé de publier leurs diverses séries de rapports en décembre 1981. Une liste complète de ces publications figure dans le volume 39, Index des publications 1982 du *Journal canadien des sciences halieutiques et aquatiques*. La série actuelle a commencé avec la publication du rapport numéro 1 en janvier 1982.

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by

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ABSTRACT

Crean, P.B. and A.B.Ages, 2000. Profiles of salinities, temperatures and oxygens in the Strait of Georgia and Howe Sound January 1969. Can. Tech. Rep. Hydrogr. Ocean Sci. 204: 22 pp.

Following the completion of a program of oceanographic observations in the Straits of Georgia and Juan de Fuca in 1968, an additional cruise was carried out in January 1969. The purpose of this cruise was to determine changes in oceanographic conditions generated by unusual cold weather over the southern coastal waters of British Columbia. In this report, profiles of salinities, temperatures and oxygens are presented for 34 stations between the southern and northern boundaries of the Strait of Georgia, including Howe Sound.

Key words: salinity, temperature, oxygen, Strait of Georgia, Howe Sound

RÉSUMÉ

Crean, P.B., and A.B. Ages, 2000. Profiles of salinities, temperatures and oxygens in the Strait of Georgia and Howe Sound January 1969. Can. Tech. Rep. Hydrogr. Ocean Sci. 204: 22 pp.

Après l'achèvement d'un programme d'observations océanographiques dans les détroits de Géorgie et de Juan de Fuca en 1968, un voyage océanographique de plus fut effectué en janvier 1969, afin d'évaluer les changements de conditions océanographiques produits par des températures atmosphériques exceptionnellement basses au-dessus des eaux côtières de la Colombie-Britannique. Ce report présente des profils verticaux de salinité, de température et d'oxygène mesurés à 34 stations entre les limites sud et nord du détroit de Géorgie, incluant la baie Howe.

Mots-clés: salinité, température, oxygène, détroit de Géorgie, baie Howe

INTRODUCTION

The successful application of hydrodynamical techniques to studies of coastal sea circulation led to a joint program of observations by the Canadian Hydrographic Service and the Pacific Oceanographic Group. The program was intended to provide a fundamental data base covering the seasonal oceanographic changes over a year for future numerical model studies. These data included sea level observations at some 30 locations, arrays of moored current meters, and observations of water properties at some 79 locations in the course of 12 oceanographic cruises at monthly intervals from December 1967 to December 1968.

In late December 1968 and in January 1969, a major outbreak of dry cold polar air gave rise to strong outflow winds in the mainland inlets and record-breaking low temperatures over the southern coastal waters of British Columbia (Figure 1). On January 8th, a rapid exploratory longitudinal survey of water temperatures in the upper 60 metres of the water column in Howe Sound was made by eight BT lowerings from the Canadian Coast Guard SRN-5 hovercraft 021 (unpublished data).

Some available ship time was then employed to extend the above cruise program to include additional observations on the 21st to 23rd January 1969 in order to capitalize on this rare opportunity to determine oceanographic changes occasioned by such extreme conditions. Additional stations were included near locations where significant near-surface outflows and deep inflows might be expected at the northern and southern extremes of the Strait of Georgia (Figure 2).

Compilation and printing were supported by the DFO Science Emeritus Program.

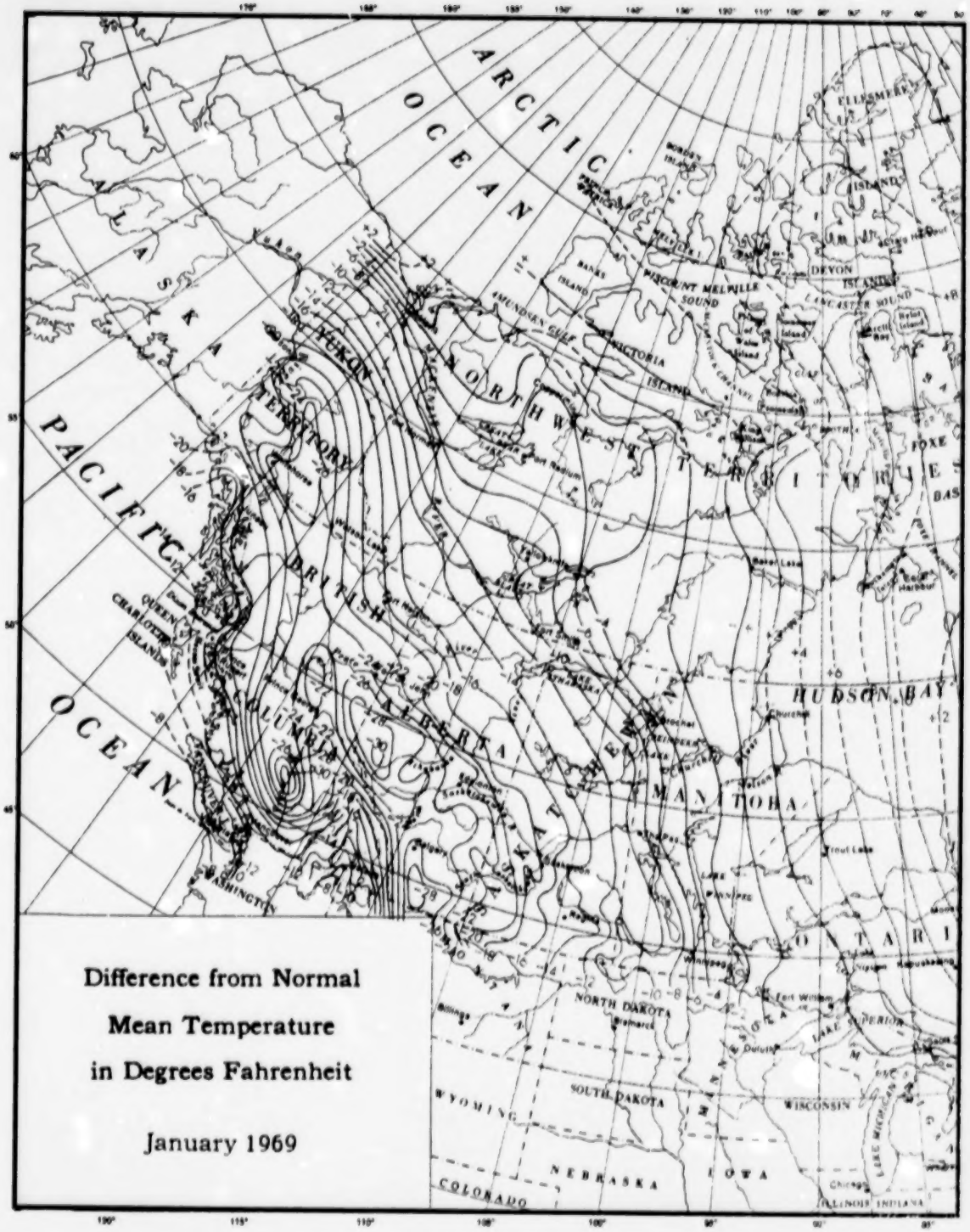

Figure 1.
Air Temperature Anomalies over Western Canada.

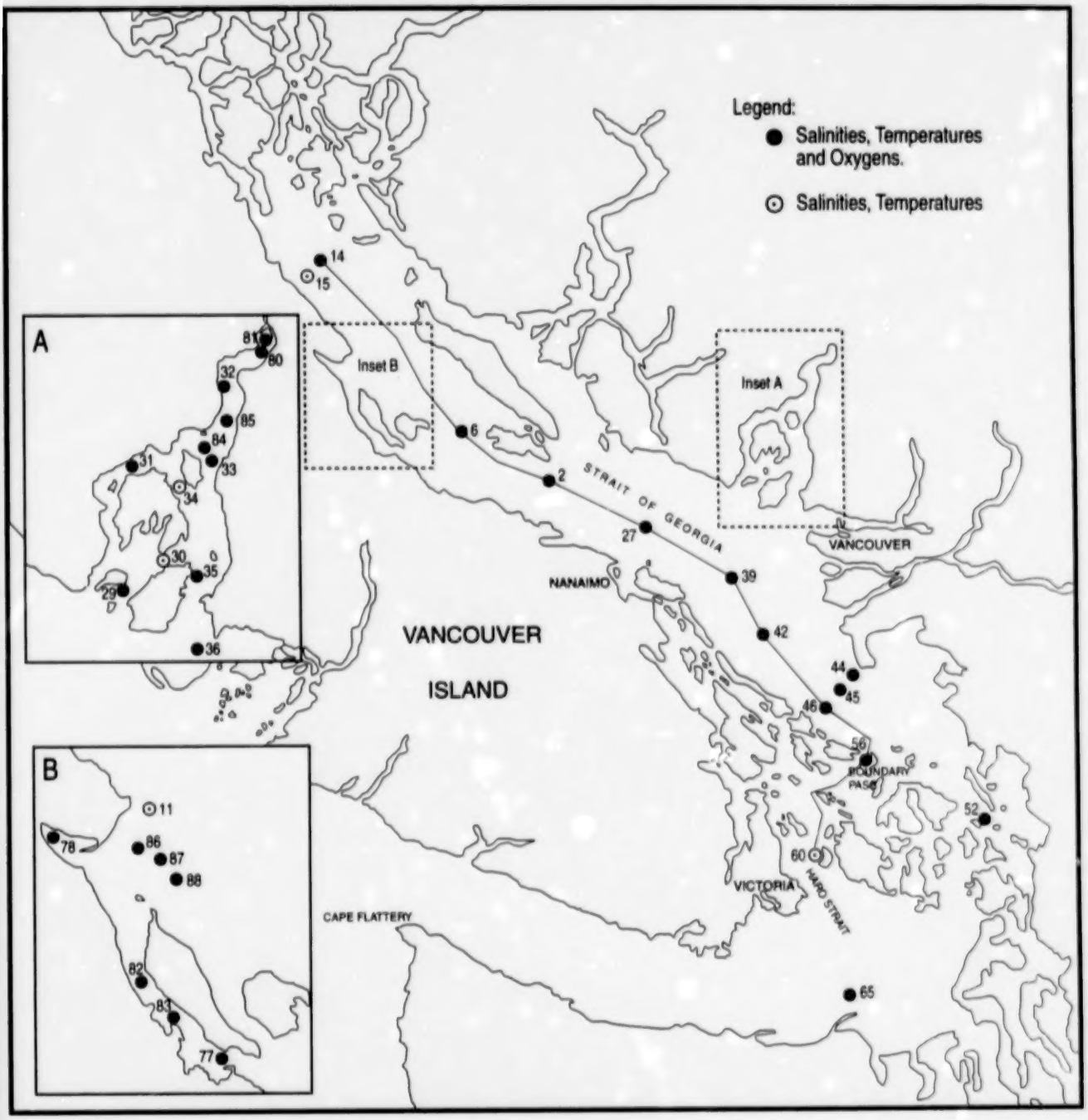

Figure 2.
Track chart showing hydrographic stations occupied by CSS Parizeau, 21-23 January 1969.

START TIME : 1969/01/22 03:36 GMT
STATION : 52
MAX. DEPTH : 75
POSITION : 75
LATITUDE : 48 38.9 N
LONGITUDE : 122 43.3 W
MISSION : 69025

DEPTH (m)	TEMPERATURE (°C)	SALINITY (PSU)	OXYGEN (ml/l)
0	3.3	29.71	6.65
5	6.48	29.65	6.27
10	6.42	29.65	6.32
20	6.46	29.65	6.22
30	6.41	29.64	6.28
50	6.42	29.64	6.21
75	6.45	29.63	6.22

START TIME : 1969/01/22 06:24 GMT
STATION : 65
MAX. DEPTH : 125
POSITION : 125
LATITUDE : 48 15.6 N
LONGITUDE : 123 10.4 W
MISSION : 69025

DEPTH (m)	TEMPERATURE (°C)	SALINITY (PSU)	OXYGEN (ml/l)
0	6.5	30.48	6.08
5	6.86	30.48	5.93
10	6.83	30.5	5.89
20	6.95	30.53	5.83
30	6.91	30.54	5.81
50	7.12	30.78	5.71
75	7.13	30.82	5.63
100	7.25	31.03	5.5
125	7.57	na	5.02

START TIME : 1969/01/22 08:30 GMT
STATION : 60
MAX. DEPTH : 250
POSITION : 250
LATITUDE : 48 33.9 N
LONGITUDE : 123 12.8 W
MISSION : 69025

DEPTH (m)	TEMPERATURE (°C)	SALINITY (PSU)	OXYGEN (ml/l)
0	5.5	30.03	
5	6.68	30.02	
10	6.65	30.03	
20	6.7	30.03	
30	6.7	30.03	
50	6.77	30.04	
75	6.74	30.08	
100	6.77	30.09	
150	6.77	30.14	
200	6.84	30.18	
250	6.91	30.29	

START TIME : 1969/01/22 10:18 GMT
STATION : 56
MAX. DEPTH : 150
POSITION : 150
LATITUDE : 48 46.3 N
LONGITUDE : 123 1.5 W
MISSION : 69025

DEPTH (m)	TEMPERATURE (°C)	SALINITY (PSU)	OXYGEN (ml/l)
0	5.5	29.52	6.3
5	6.59	29.41	6.02
10	6.67	29.7	5.96
20	6.69	29.72	5.95
30	6.67	29.72	6.05
50	6.73	29.72	5.91
75	6.69	29.73	5.98
100	6.7	29.73	5.95
150	6.68	29.74	5.95

START TIME : 1969/01/22 11:30 GMT
STATION : 46
MAX. DEPTH : 150
POSITION : 150
LATITUDE : 48 51.4 N
LONGITUDE : 123 10.8 W
MISSION : 69025

DEPTH (m)	TEMPERATURE (°C)	SALINITY (PSU)	OXYGEN (ml/l)
0	3.2	26.98	7.03
5	4.56	26.88	6.92
10	5.57	27.94	6.33
20	6.88	28.66	5.68
30	7.32	28.84	5.53
50	7.37	29.22	5.52
75	6.83	29.38	5.55
100	6.78	29.57	5.85
150	6.8	29.75	5.86

START TIME : 1969/01/22 12:12 GMT
STATION : 45
MAX. DEPTH : 100
POSITION : 100
LATITUDE : 48 54.0 N
LONGITUDE : 123 8.3 W
MISSION : 69025

DEPTH (m)	TEMPERATURE (°C)	SALINITY (PSU)	OXYGEN (ml/l)
0	2.5	27.97	6.85
5	5.49	27.97	6.53
10	5.45	27.98	6.42
20	6.44	28.4	6.14
30	7	29.24	5.88
50	6.67	29.59	6.08
75	6.64	29.65	6.03
100	6.68	29.68	5.99

START TIME : 1969/01/22 12:48 GMT
STATION : 44
MAX. DEPTH : 100
POSITION : 100
LATITUDE : 48 56.8 N
LONGITUDE : 123 5.9 W
MISSION : 69025

DEPTH (m)	TEMPERATURE (°C)	SALINITY (PSU)	OXYGEN (ml/l)
0	4.5	29.01	6.57
5	5.66	28.99	6.58
10	5.71	29.04	6.47
20	6.37	29.45	6.28
30	6.5	29.55	6.13
50	6.68	29.62	6.06
75	6.63	29.64	6.04
100	6.73	29.73	5.91

START TIME : 1969/01/22 14:12 GMT
STATION : 42
MAX. DEPTH : 300
POSITION : 300
LATITUDE : 49 1.9 N
LONGITUDE : 123 26.2 W
MISSION : 69025

DEPTH (m)	TEMPERATURE (°C)	SALINITY (PSU)	OXYGEN (ml/l)
0	3.5	27.04	7.11
5	4.48	26.9	7
10	4.9	27.35	6.91
20	6.71	28.4	5.99
30	6.87	28.58	5.98
50	6.32	28.97	6.17
75	6.31	29.62	5.61
100	7.49	29.76	5.53
150	7.65	30.01	5.07
200	9.04	30.6	3.33
250	9.06	30.8	3.15
300	9.06	30.91	2.96

START TIME : 1969/01/22 15:24 GMT
STATION : 39
MAX. DEPTH : 350
POSITION : 350
LATITUDE : 49 9.8 N
LONGITUDE : 123 33.0 W
MISSION : 69025

DEPTH (m)	TEMPERATURE (°C)	SALINITY (PSU)	OXYGEN (ml/l)
0	2.2	26.13	7.32
5	3.7	26.42	7.29
10	4.13	27.04	7.1
20	5.99	27.8	6.68
30	6.61	28.36	6.11
50	7.18	28.69	5.77
75	7.83	29.34	5.23
100	7.65	29.66	5.35
150	8.5	30.23	4.25
200	9.1	30.75	3.17
250	9.08	30.84	2.99
300	9.09	30.93	2.87
350	9.05	31.01	2.8

START TIME : 1969/01/22 16:48 GMT
STATION : 36
MAX. DEPTH : 150
POSITION : 150
LATITUDE : 49 19.0 N
LONGITUDE : 123 20.0 W
MISSION : 69025

DEPTH (m)	TEMPERATURE (°C)	SALINITY (PSU)	OXYGEN (ml/l)
0	4.8	27.89	6.29
5	6.19	28.12	6.12
10	7.18	29.25	5.67
20	7.45	29.49	5.6
30	7.83	29.62	5.25
50	7.78	29.68	5.34
75	6.75	29.65	5.68
100	7.02	29.74	5.71
150	7.45	29.87	5.83

START TIME : 1969/01/22 17:42 GMT
STATION : 35
MAX. DEPTH : 230
POSITION : 230
LATITUDE : 49 23.8 N
LONGITUDE : 123 17.5 W
MISSION : 69025

DEPTH (m)	TEMPERATURE (°C)	SALINITY (PSU)	OXYGEN (ml/l)
0	4.5	29.33	6.15
5	7.05	29.33	5.8
10	7.03	29.33	5.79
20	7.12	29.33	5.83
30	7.06	29.33	5.81
50	7.15	29.34	5.79
75	7.23	29.46	5.66
100	7.35	29.7	5.57
150	7.29	29.88	5.51
200	9.04	30.65	3.25
230	9.05	30.84	2.84

START TIME : 1969/01/22 18:42 GMT
STATION : 34
MAX. DEPTH : 225
POSITION : 225
LATITUDE : 49 30.5 N
LONGITUDE : 123 19.7 W
MISSION : 69025

DEPTH (m)	TEMPERATURE (°C)	SALINITY (PSU)	OXYGEN (ml/l)
0	4.4	29.26	
5	7.08	29.18	
10	7.05	29.19	
20	7.19	29.27	
30	7.37	29.29	
50	8.24	29.81	
75	7.65	29.86	
100	7.67	29.9	
150	8.57	30.22	
200	9.06	30.71	
225	9.04	30.84	

START TIME : 1969/01/22 19:30 GMT
STATION : 33
MAX. DEPTH : 150
POSITION : 150
LATITUDE : 49 32.5 N
LONGITUDE : 123 16.3 W
MISSION : 69025

DEPTH (m)	TEMPERATURE (°C)	SALINITY (PSU)	OXYGEN (ml/l)
0	4.9	29.53	5.68
5	7.75	29.54	5.32
10	7.69	29.54	5.19
20	7.78	29.55	5.39
30	7.7	29.57	5.14
50	7.83	29.69	5.19
75	8.21	29.92	4.79
100	8.23	30.03	4.68
150	8.18	30.1	4.52

START TIME : 1969/01/22 20:12 GMT
STATION : 84
MAX. DEPTH : 50
POSITION : 50
LATITUDE : 49 33.5 N
LONGITUDE : 123 16.5 W
MISSION : 69025

DEPTH (m)	TEMPERATURE (°C)	SALINITY (PSU)	OXYGEN (ml/l)
0	6.6	29.36	5.63
5	7.53	29.33	5.41
10	7.47	29.33	5.27
20	7.78	29.43	5.16
30	7.99	29.61	5.1
50	8.35	29.75	4.75

START TIME : 1969/01/22 20:54 GMT
STATION : 85
MAX. DEPTH : 250
POSITION : 250
LATITUDE : 49 34.7 N
LONGITUDE : 123 14.8 W
MISSION : 69025

DEPTH (m)	TEMPERATURE (°C)	SALINITY (PSU)	OXYGEN (ml/l)
0	6.3	29.59	5.37
5	7.82	29.55	5.16
10	7.74	29.55	5.1
20	7.82	29.56	5.1
30	7.81	29.58	5.12
50	7.92	29.71	4.97
75	8.07	29.82	4.88
100	8.48	29.95	4.2
150	8.78	30.25	1.7
200	8.81	30.29	1.35
250	8.79	30.29	1.19

START TIME : 1969/01/22 21:48 GMT
STATION : 32
MAX. DEPTH : 200
POSITION : 200
LATITUDE : 49 38.7 N
LONGITUDE : 123 14.3 W
MISSION : 69025

DEPTH (m)	TEMPERATURE (°C)	SALINITY (PSU)	OXYGEN (ml/l)
0	5.7	29.75	4.99
5	7.91	na	4.85
10	7.89	29.7	4.81
20	8.04	na	4.88
30	7.98	29.74	4.97
50	8.13	29.79	4.69
75	8.58	na	4.17
100	8.57	30.04	3.54
150	8.77	30.25	1.43
200	8.77	30.28	0.93

START TIME : 1969/01/22 22:36 GMT
STATION : 80
MAX. DEPTH : 150
POSITION : 150
LATITUDE : 49 40.2 N
LONGITUDE : 123 12.0 W
MISSION : 69025

DEPTH (m)	TEMPERATURE (°C)	SALINITY (PSU)	OXYGEN (ml/l)
0	6.1	29.34	5.2
5	7.28	28.55	5.12
10	7.9	29.57	4.74
20	8.28	29.82	4.73
30	8.21	29.83	4.57
50	8.38	29.86	4.41
75	8.4	na	4.23
100	8.63	30.01	3.68
150	8.79	30.18	1.92

START TIME : 1969/01/22 23:12 GMT
STATION : 81
MAX. DEPTH : 50
POSITION : 50
LATITUDE : 49 40.6 N
LONGITUDE : 123 10.5 W
MISSION : 69025

DEPTH (m)	TEMPERATURE (°C)	SALINITY (PSU)	OXYGEN (ml/l)
0	6.5	29.67	4.47
5	8.16	29.52	4.35
10	8.28	29.81	4.27
20	8.29	29.83	4.42
30	8.38	29.87	4.23
50	8.27	29.88	4.28

START TIME : 1969/01/23 00:42 GMT
STATION : 31
MAX. DEPTH : 200
POSITION : 200
LATITUDE : 49 31.4 N
LONGITUDE : 123 27.1 W
MISSION : 69025

DEPTH (m)	TEMPERATURE (°C)	SALINITY (PSU)	OXYGEN (ml/l)
0	3.2	27.72	6.98
5	5.13	27.9	6.57
10	5.62	28.17	5.01
20	7.11	28.98	4.56
30	8.26	29.52	4.78
50	na	29.98	3.88
75	na	30.11	3.72
100	8.93	30.15	4.08
150	na	30.31	3.48
200	9.06	30.67	2.81

START TIME : 1969/01/23 01:42 GMT
STATION : 30
MAX. DEPTH : 200
POSITION : 200
LATITUDE : 49 25.3 N
LONGITUDE : 123 22.2 W
MISSION : 69025

DEPTH (m)	TEMPERATURE (°C)	SALINITY (PSU)	OXYGEN (ml/l)
0	5	28.76	
5	6.22	28.81	
10	6.79	28.92	
20	6.65	29.05	
30	7.43	29.31	
50	7.7	29.49	
75	8.22	29.83	
100	8.64	30.06	
150	8.4	30.21	
200	9.1	30.64	

START TIME : 1969/01/23 02:24 GMT
STATION : 29
MAX. DEPTH : 150
POSITION : 150
LATITUDE : 49 23.5 N
LONGITUDE : 123 25.3 W
MISSION : 69025

DEPTH (m)	TEMPERATURE (°C)	SALINITY (PSU)	OXYGEN (ml/l)
0	3.6	27.52	6.91
5	5.26	27.75	6.56
10	6.46	28.61	6.03
20	7.43	28.99	5.77
30	7.53	29.3	5.51
50	7.71	29.45	5.45
75	7.78	29.75	5.29
100	7.89	29.85	5.12
150	9	30.32	3.68

START TIME : 1969/01/23 03:54 GMT
STATION : 27
MAX. DEPTH : 340
POSITION : 340
LATITUDE : 49 19.0 N
LONGITUDE : 123 48.1 W
MISSION : 69025

DEPTH (m)	TEMPERATURE (°C)	SALINITY (PSU)	OXYGEN (ml/l)
0	3.1	26.79	7.43
5	3.72	26.78	7.32
10	4.58	27.5	7.22
20	5.41	27.85	6.81
30	6.48	28.35	6.19
50	8.21	29.29	5.04
75	8.55	29.72	4.88
100	8.74	30.07	4.53
150	8.75	30.37	4.02
200	9.09	30.65	3.42
250	9.09	30.87	3.09
300	9.07	30.93	2.91
340	9.06	31.01	2.8

START TIME : 1969/01/23 05:42 GMT
STATION : 2
MAX. DEPTH : 250
POSITION : 250
LATITUDE : 49 24.1 N
LONGITUDE : 124 9.4 W
MISSION : 69025

DEPTH (m)	TEMPERATURE (°C)	SALINITY (PSU)	OXYGEN (ml/l)
0	4.2	27.44	7.06
5	4.82	27.46	6.95
10	5.06	27.89	6.75
20	6.24	28.29	6.52
30	7.09	28.72	5.82
50	8.11	29.41	5.09
75	8.25	29.75	4.78
100	8.69	30.03	4.6
150	9.05	30.44	3.76
200	9.12	30.71	3.25
250	9.05	30.87	2.93

START TIME : 1969/01/23 06:54 GMT
STATION : 6
MAX. DEPTH : 180
POSITION : 180
LATITUDE : 49 30.5 N
LONGITUDE : 124 27.8 W
MISSION : 69025

DEPTH (m)	TEMPERATURE (°C)	SALINITY (PSU)	OXYGEN (ml/l)
0	3.9	28.09	6.98
5	4.93	28.07	6.95
10	4.89	28.07	6.87
20	5.29	28.12	6.91
30	6.03	28.33	6.37
50	7.33	28.83	5.53
75	8.43	29.58	4.38
100	8.92	30.24	4.03
150	9.06	30.6	3.36
180	9.09	30.69	3.18

START TIME : 1969/01/23 08:30 GMT
STATION : 11
MAX. DEPTH : 300
POSITION : 300
LATITUDE : 49 42.5 N
LONGITUDE : 124 43.4 W
MISSION : 69025

DEPTH (m)	TEMPERATURE (°C)	SALINITY (PSU)	OXYGEN (ml/l)
0	3.7	28.08	
5	4.61	28.04	
10	4.62	28.05	
20	5.8	28.3	
30	6.51	28.5	
50	7.79	29.13	
75	8.6	29.65	
100	8.96	30.01	
150	9.1	30.43	
200	9.15	30.63	
250	9.11	30.72	
300	9.09	na	

START TIME : 1969/01/23 10:00 GMT
STATION : 14
MAX. DEPTH : 300
POSITION : 300
LATITUDE : 49 52.9 N
LONGITUDE : 124 59.4 W
MISSION : 69025

DEPTH (m)	TEMPERATURE (°C)	SALINITY (PSU)	OXYGEN (ml/l)
0	3.7	28.09	6.86
5	4.78	28.06	6.87
10	4.72	28.07	6.82
20	5.01	28.17	6.64
30	6.43	28.61	6.34
50	6.63	28.81	5.79
75	8.02	29.52	4.55
100	8.95	29.97	4.22
150	9.08	30.39	3.83
200	9.15	30.62	3.19
250	9.13	30.7	3.19
300	9.1	30.73	3.19

START TIME : 1969/01/23 10:42 GMT
STATION : 15
MAX. DEPTH : 100
POSITION : 100
LATITUDE : 49 51.6 N
LONGITUDE : 125 1.4 W
MISSION : 69025

DEPTH (m)	TEMPERATURE (°C)	SALINITY (PSU)	OXYGEN (ml/l)
0	4	28	
5	4.58	27.97	
10	4.55	27.98	
20	5.53	28.33	
30	6.32	28.75	
50	7	29.02	
75	7.79	29.46	
100	8.27	29.89	

START TIME : 1969/01/23 14:54 GMT
STATION : 78
MAX. DEPTH : 20
POSITION : 20
LATITUDE : 49 39.6 N
LONGITUDE : 124 55.9 W
MISSION : 69025

DEPTH (m)	TEMPERATURE (°C)	SALINITY (PSU)	OXYGEN (ml/l)
0	2.6	29.68	7.22
5	5.04	27.92	6.97
10	5.05	27.98	6.61
20	5.42	28.03	6.54

START TIME : 1969/01/23 15:48 GMT
STATION : 82
MAX. DEPTH : 30
POSITION : 30
LATITUDE : 49 33.0 N
LONGITUDE : 124 51.1 W
MISSION : 69025

DEPTH (m)	TEMPERATURE (°C)	SALINITY (PSU)	OXYGEN (ml/l)
0	4.5	27.75	6.72
5	5.26	27.79	6.55
10	5.4	27.86	6.54
20	6.11	28.15	6.26
30	6.41	28.24	6.1

START TIME : 1969/01/23 16:24 GMT
STATION : 83
MAX. DEPTH : 50
POSITION : 50
LATITUDE : 49 30.3 N
LONGITUDE : 124 47.1 W
MISSION : 69025

DEPTH (m)	TEMPERATURE (°C)	SALINITY (PSU)	OXYGEN (ml/l)
0	3.8	27.63	6.71
5	4.78	27.66	6.74
10	4.96	27.79	6.65
20	5.24	27.95	6.52
30	6.08	28.15	6.36
50	6.74	28.34	5.77

START TIME : 1969/01/23 17:00 GMT
STATION : 77
MAX. DEPTH : 65
POSITION : 65
LATITUDE : 49 28.5 N
LONGITUDE : 124 45.2 W
MISSION : 69025

DEPTH (m)	TEMPERATURE (°C)	SALINITY (PSU)	OXYGEN (ml/l)
0	4.2	27.9	6.73
5	5.03	27.94	6.66
10	5	27.98	6.65
20	5.31	28.04	6.61
30	5.34	28.07	6.53
50	5.33	28.08	6.58
65	5.3	28.08	6.65

START TIME : 1969/01/23 18:30 GMT
STATION : 86
MAX. DEPTH : 42
POSITION : 42
LATITUDE : 49 40.2 N
LONGITUDE : 124 48.3 W
MISSION : 69025

DEPTH (m)	TEMPERATURE (°C)	SALINITY (PSU)	OXYGEN (ml/l)
0	3.8	27.92	7.13
5	4.64	27.89	6.99
10	4.57	27.89	6.95
20	4.69	27.91	7.09
30	5.77	28.27	6.51
42	7.19	28.95	5.37

START TIME : 1969/01/23 19:00 GMT
STATION : 87
MAX. DEPTH : 65
POSITION : 65
LATITUDE : 49 39.1 N
LONGITUDE : 124 47.6 W
MISSION : 69025

DEPTH (m)	TEMPERATURE (°C)	SALINITY (PSU)	OXYGEN (ml/l)
0	3.9	27.93	7.01
5	4.7	27.91	6.85
10	4.63	27.91	6.82
20	4.71	27.91	7.11
30	5.95	28.32	6.27
50	7.4	28.98	5.27
65	7.45	29.14	5.16

START TIME : 1969/01/23 19:30 GMT
STATION : 88
MAX. DEPTH : 48
POSITION : 48
LATITUDE : 49 38.2 N
LONGITUDE : 124 46.7 W
MISSION : 69025

DEPTH (m)	TEMPERATURE (°C)	SALINITY (PSU)	OXYGEN (ml/l)
0	4.5	27.93	6.94
2	4.69	27.91	7
7	4.66	27.92	6.96
17	4.7	27.92	7.02
27	4.7	27.93	7.07
48	7.43	29.05	5.12